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ABM

Missiles

A Burst of X-Rays for Nuclear Defense

By JOHN W. FINNEY

WASHINGTON — The question of whether the United States should build a multibillion-dollar missile defense system started off a highly complex technical problem but increasingly has become a political decision. Last week, the Administration came up with a Buck Rogerish concept that seemed to answer some of the technical questions, and that may also neutralize the political debate.

The new concept is the use of X-rays from thermonuclear explosions to destroy ballistic missile warheads. Technically, the X-rays promise to simplify the highly complex problem of intercepting and destroying a warhead—a problem in ballistics that can be compared with trying to hit a bullet with another bullet.

Politically, the X-ray approach might temper the growing debate over deployment of an antiballistic missile system, and this may help explain why the Defense Department, in heavily censored testimony released last week by the Senate Disarmament subcommittee, permitted the first official reference to leak out about the "advance" in ABM defenses that had been permitted by the shift to X-rays as a destructive agent against ballistic missiles.

How X-Rays Work

The idea of using X-rays is based on a few well-known physical facts—well known at any rate to Soviet as well as American weapons designers. Above the earth's atmosphere, much of the energy of an atomic explosion is given off in the form of extremely energetic X-rays. In the near vacuum of space, with nothing to stop them as in the atmosphere, the X-rays travel tremendous distances with the speed of light, although their energy tapers off with distance. If while still in the energetic stage, however, the X-rays collide with an object, such as a warhead, their electromagnetic energy is abruptly transformed into a burst of thermal energy. ~~warhead, their electromagnetic~~

The result is to set off what amounts to a small, conventional explosion in the warhead. Its outer casing is shattered and a shock wave is sent crashing inwards that destroys the explosive mechanisms of the warhead. In effect, the warhead is defused and it falls harmlessly toward earth, probably to burn up on reentering the earth's atmosphere.

In effect, for a brief moment over a broad area, a protective shield of X-rays is thrown up against the warheads. In the process, there are no harmful effects upon the populations below. The X-rays are stopped by the atmosphere, and there is no immediate fallout since the explosions are so high that their radioactive materials remain in the stratosphere, only gradually filtering to earth.

The X-ray "shield" is an intrinsic part of the Nike X missile defense system now being developed by the United States. The Spartan missiles, with their "area defense" of X-rays, would provide the first line of defense. The warheads that penetrated this line would be taken care of at lower altitudes by Sprint missiles, providing the "terminal defense." To a certain extent, the X-ray concept, in permitting "area defense," simplifies but does not solve the technical problem of designing an effective defense against a Soviet missile attack.

The Soviet Union could still overwhelm the defense by throwing at it more missile warheads and decoys than it could handle. At least that is the basic argument of Defense Secretary Robert S. McNamara in arguing against deployment of a "heavy ABM system, costing anywhere from $10-billion upwards, against the Soviet Union.

The technical value of the X-ray concept, rather, lies in providing an area-defense against a small-scale, unsophisticated attack such as Communist China might be capable of launching in another five years. As Dr. John S. Foster director of defense research and engineering, described it to the disarmament subcommittee: "Comparatively few Spartan batteries can defend the whole United States from simple attacks" and at a cost of only around $4-billion.

It is at this point that political considerations begin to enter into the complicated technical equations. By going ahead with a Spartan "area-defense" system, the Administration might be able to appease all the divergent political factions on the ABM issue. It would relieve the pressures from the large Congressional faction that is arguing that the United States should match the Soviet Union, which is deploying its own system around Moscow and perhaps other cities, by starting to deploy its own system.

At the same time, it could disarm the "disarmers," who are worried that a United States deployment might set off another round in the arms race. The Soviet Union would know that the "light" system is not designed against Soviet rockets, except perhaps one that got away from "fail-safe" controls. It would reassure those in Congress who are becoming increasingly worried about Chinese nuclear capabilities. And finally, the Administration could take the political sting out of any "ABM gap" that the Republicans might try to point to in the elections next year.